



SEQUENCE LISTING

<110> Cho, Myeong-Je
del Val, Gregorio
Caillau, Maxime
Lemaux, Peggy G.
Buchanan, Bob B.

<120> BARLEY GENE FOR THIOREDOXIN AND
NADP-THIOREDOXIN REDUCTASE

<130> 416272001410

<140> US 10/091,841

<141> 2002-03-05

<150> US 09/540,014

<151> 2000-03-31

<150> US 60/127,198

<151> 1999-03-31

<150> US 60/169,162

<151> 1999-12-06

<150> US 60/177,740

<151> 2000-01-21

<150> US 60/177,739

<151> 2000-01-21

<160> 51

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<210> 1

<211> 369

<212> DNA

<213> Artificial Sequence

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<223> Barley Thioredoxin h cDNA

<400> 1

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ttcactgcat catggtgcgg accatgccgc atcatggctc cagttttcgc tgatctcgcc 180
aagaagttcc caaatgctgt tttcctcaag gtcgacgtgg atgaactgaa gcccattgct 240
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<210> 2

<211> 122

<212> PRT

<213> Hordeum vulgare

<400> 2

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Ala Lys Lys Leu Val Val Ile Asp Phe Thr Ala Ser Trp Cys Gly Pro
          35          40          45
Cys Arg Ile Met Ala Pro Val Phe Ala Asp Leu Ala Lys Lys Phe Pro
          50          55          60
Asn Ala Val Phe Leu Lys Val Asp Val Asp Glu Leu Lys Pro Ile Ala
65          70          75          80
Glu Gln Phe Ser Val Glu Ala Met Pro Thr Phe Leu Phe Met Lys Glu
          85          90          95
Gly Asp Val Lys Asp Arg Val Val Gly Ala Ile Lys Glu Glu Leu Thr
          100          105          110
Ala Lys Val Gly Leu His Ala Ala Ala Gln
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<211> 382

<212> DNA

<213> Artificial Sequence

<220>

<223> Wheat Thioredoxin h cDNA

<400> 3

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aagctgggtg tgattgactt cactgcatca tgggtcggac catgccgcat tatgggtcca 180
attttcgctg atctcgccaa gaagttccca gctgctgttt tcctcaaggt cgacgttgat 240
gaactgaagc ccattgctga gcaattcagc gtggaggcca tgccaacctt cctgttcatt 300
aaggaaggag atgtcaagga cagggttgtc ggagctatca aggaggaact gacgaccaag 360
gttgggctac acgcggcccc ag                                     382
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<210> 4

<211> 127

<212> PRT

<213> Triticum Aestivum

<400> 4

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          20          25          30
Ile Glu Glu Ala Asn Ala Ala Lys Lys Leu Val Val Ile Asp Phe Thr
          35          40          45
Ala Ser Trp Cys Gly Pro Cys Arg Ile Met Ala Pro Ile Phe Ala Asp
          50          55          60
Leu Ala Lys Lys Phe Pro Ala Ala Val Phe Leu Lys Val Asp Val Asp
65          70          75          80
Glu Leu Lys Pro Ile Ala Glu Gln Phe Ser Val Glu Ala Met Pro Thr
          85          90          95
Phe Leu Phe Met Lys Glu Gly Asp Val Lys Asp Arg Val Val Gly Ala
          100          105          110
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Ile Lys Glu Glu Leu Thr Thr Lys Val Gly Leu His Ala Ala Gln
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 <223> Wheat Thioredoxin cDNA

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 gccgccaaga agctggtggt gattgacttc actgcatcat ggtgcggacc atgccgcatt 180
 atggctccaa tttttgctga tctcgccaag aagttcccag ctgctgtttt cctcaagggtc 240
 gacgttgatg aactgaagcc cattgctgag caattcagcg tcgaggccat gccaaccttc 300
 ctgttcatga aggaaggaga cgtcaaggac agggttgtcg gagctatcaa ggaggagctg 360
 acgaccaagg ttgggctcca cgcggtgcc tag 393

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 <211> 130
 <212> PRT
 <213> Triticum Durum

<400> 6
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 20 25 30
 Thr Met Gln Ile Glu Glu Ala Asn Ala Ala Lys Lys Leu Val Val Ile
 35 40 45
 Asp Phe Thr Ala Ser Trp Cys Gly Pro Cys Arg Ile Met Ala Pro Ile
 50 55 60
 Phe Ala Asp Leu Ala Lys Lys Phe Pro Ala Ala Val Phe Leu Lys Val
 65 70 75 80
 Asp Val Asp Glu Leu Lys Pro Ile Ala Glu Gln Phe Ser Val Glu Ala
 85 90 95
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 100 105 110
 Val Gly Ala Ile Lys Glu Glu Leu Thr Thr Lys Val Gly Leu His Ala
 115 120 125
 Ala Ala
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<210> 7
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<221> misc_feature
 <222> (1)...(26)

<223> n = A,T,C or G

<400> 7

gtaaagcntt aacaacccac acattg

26

<210> 8

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 8

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34

<210> 9

<211> 332

<212> PRT

<213> Hordeum Vulgare

<400> 9

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Gly	Ser	Gly	Pro	Ala	Ala	His	Thr	Ala	Ala	Ile	Tyr	Ala	Ala	Arg	Ala	
			20					25					30			
Glu	Leu	Lys	Pro	Val	Leu	Phe	Glu	Gly	Trp	Met	Ala	Asn	Asp	Ile	Ala	
		35					40					45				
Ala	Gly	Gly	Gln	Leu	Thr	Thr	Thr	Asp	Val	Glu	Asn	Phe	Pro	Gly		
	50					55				60						
Phe	Pro	Thr	Gly	Ile	Met	Gly	Ile	Asp	Leu	Met	Asp	Asn	Cys	Arg	Ala	
65				70					75					80		
Gln	Ser	Val	Arg	Phe	Gly	Thr	Asn	Ile	Leu	Ser	Glu	Thr	Val	Thr	Glu	
			85					90					95			
Val	Asp	Phe	Ser	Ala	Arg	Pro	Phe	Arg	Val	Thr	Ser	Asp	Ser	Thr	Thr	
			100					105					110			
Val	Leu	Ala	Asp	Thr	Val	Val	Val	Ala	Thr	Gly	Ala	Val	Ala	Arg	Arg	
		115					120					125				
Leu	His	Phe	Ser	Gly	Ser	Asp	Thr	Tyr	Trp	Asn	Arg	Gly	Ile	Ser	Ala	
	130					135					140					
Cys	Ala	Val	Cys	Asp	Gly	Ala	Ala	Pro	Ile	Phe	Arg	Asn	Lys	Pro	Ile	
145				150						155				160		
Ala	Val	Ile	Gly	Gly	Gly	Asp	Ser	Ala	Met	Glu	Glu	Gly	Asn	Phe	Leu	
			165					170					175			
Thr	Lys	Tyr	Gly	Ser	Gln	Val	Tyr	Ile	Ile	His	Arg	Arg	Asn	Thr	Phe	
		180					185						190			
Arg	Ala	Ser	Lys	Ile	Met	Gln	Ala	Arg	Ala	Leu	Ser	Asn	Pro	Lys	Ile	
		195				200						205				
Gln	Val	Val	Trp	Asp	Ser	Glu	Val	Val	Glu	Ala	Tyr	Gly	Gly	Ala	Gly	
	210					215					220					
Gly	Gly	Pro	Leu	Ala	Gly	Val	Lys	Val	Lys	Asn	Leu	Val	Thr	Gly	Glu	
225				230					235					240		
Val	Ser	Asp	Leu	Gln	Val	Ser	Gly	Leu	Phe	Phe	Ala	Ile	Gly	His	Glu	
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Pro	Ala	Thr	Lys	Phe	Leu	Asn	Gly	Gln	Leu	Glu	Leu	His	Ala	Asp	Gly	
			260				265					270				
Tyr	Val	Ala	Thr	Lys	Pro	Gly	Ser	Thr	His	Thr	Ser	Val	Glu	Gly	Val	

	275		280		285										
Phe	Ala	Ala	Gly	Asp	Val	Gln	Asp	Lys	Lys	Tyr	Arg	Gln	Ala	Ile	Thr
	290		295		300										
Ala	Ala	Gly	Ser	Gly	Cys	Met	Ala	Ala	Leu	Asp	Ala	Glu	His	Tyr	Leu
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Gln	Glu	Val	Gly	Ala	Gln	Val	Gly	Lys	Ser	Asp	Glx				
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<210> 10
 <211> 995
 <212> DNA
 <213> Hordeum Vulgare

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 ggctggatgg ccaacgacat cgcgcggggg ggccagctca ccaccaccac cgacgtcgag 180
 aacttccccg gattccccac cggcatcatg ggcatcgacc tcatggacaa ctgccgcgcc 240
 cagtccgtcc gcttcggcac caacatcctc tccgagaccg tcaccgaggt cgacttctcc 300
 gccgcgccct tccgcgtcac ctccgactcc accaccgtcc tcgccgacac cgtcgtcgtc 360
 gccacgggcg ccgtcgcgcg ccgcctccat ttctccgggt ccgacaccta ctggaaccgc 420
 ggcattctcc cctgcgcggt ctgcgacggc gctgcgccca tcttccggaa caagcccatc 480
 gccgtcatcg gcggcggtga ttccgccatg gaggaaggca acttcctcac caagtacgga 540
 tcccaagtgt acatcatcca cgggcgcgaac accttccgcg cctccaagat tatgcaggct 600
 agggcgctct ccaatcctaa gatccaggtt gtctgggact cgaggtcgtc gaggcttacg 660
 gcggtgcagg cggcggccca ttagctgggg tcaagggtcaa gaacttggtg actggtgagg 720
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 aggaggtggg tgcacaggtg ggcaagtctg attga 995

<210> 11
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 <212> DNA
 <213> Barley

<400> 11
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 tgtgtgacat gtaaagtga taagggtgagt catgcatacc aaacctcggg atttctatac 180
 tttgtgtatg atcatatgca caactaaaag gcaactttga ttatcaattg aaaagtaccg 240
 cttgtagctt gtgcaacct acaaatgtc caaaaatcca ttgcaaaaag catccaaaca 300
 caattgttaa agctgttcaa acaacaaaag aagagatgaa gcctggctac tataaatagg 360
 caggtagtat agagatctac acaagcaca gcacaaaac caagaaacac tagttaacac 420
 caatccacta tgaagacct cctcatcttt gcactcctcg ccattgcggc aacaagtacg 480
 attga 486

<210> 12
 <211> 497
 <212> DNA
 <213> Barley

<400> 12
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cagcaaacag taccccagaa ctaggattaa gccgattacg cggcttttagc agaccgtcca 180
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 aaactgcact tgtccaaccg attttgttct tcccgtgttt cttcttaggc taactaacac 300
 agccgtgcac atagccatgg tccggaatct tcacctcgtc cctataaaaag cccagccaat 360
 ctccacaatc tcatcatcac cgagaacacc gagaaccaca aaactagaga tcaattcatt 420
 gacagtccac cgagatggct aagcggctgg tcctctttgt ggcggtaatc gtcgccctcg 480
 tggctctcac caccgct 497

<210> 13

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Degenerative Primer

<400> 13

ttcttcgcsa tccgmca yga rcc 23

<210> 14

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Degenerative Primer

<400> 14

gcgtcsarrg crgcatgca scc 23

<210> 15

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 15

acsacsacs csgacgtsga raa 23

<210> 16

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 16

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<210> 17

<211> 20

<212> DNA

<213> Artificial Sequence

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 <223> Primer

 <400> 17
 aattaaccct cactaaaggg 20

 <210> 18
 <211> 21
 <212> DNA
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 <400> 18
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 <210> 19
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 <220>
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 <400> 19
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 <210> 20
 <211> 21
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 <220>
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 <400> 20
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 <210> 21
 <211> 30
 <212> DNA
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 <220>
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 <400> 21
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 <210> 22
 <211> 30
 <212> DNA
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 <220>
 <223> Primer

<400> 22
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<210> 23
 <211> 995
 <212> DNA
 <213> Hordeum Vulgare

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 ggctggatgg ccaacgacat cgccgcgggg ggccagctca ccaccaccac cgacgtcgag 180
 aacttccccg gattccccac cggcatcatg ggcatcgacc tcatggacaa ctgccgcgcc 240
 cagtcgctcc gcttcggcac caacatcctc tccgagaccg tcaccgaggt cgacttctcc 300
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 <211> 332
 <212> PRT
 <213> Arabidopsis Thaliana

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 35 40 45
 Gly Gln Leu Asn Gln Pro Pro Arg Glu Asn Phe Pro Gly Phe Pro Glu
 50 55 60
 Gly Ile Leu Gly Val Glu Leu Thr Asp Lys Phe Arg Lys Gln Ser Glu
 65 70 75 80
 Arg Phe Gly Thr Thr Ile Phe Thr Glu Thr Val Thr Lys Val Asp Phe
 85 90 95
 Ser Ser Lys Pro Phe Lys Leu Phe Thr Asp Ser Lys Ala Ile Leu Ala
 100 105 110
 Asp Ala Val Ile Leu Ala Ile Gly Ala Val Ala Lys Trp Leu Ser Phe
 115 120 125
 Val Gly Ser Gly Glu Val Leu Gly Gly Leu Trp Asn Arg Gly Ile Ser
 130 135 140
 Ala Cys Ala Val Cys Asp Gly Ala Ala Pro Ile Phe Arg Asn Lys Pro
 145 150 155 160
 Leu Ala Val Ile Gly Gly Gly Asp Ser Ala Met Glu Glu Ala Asn Phe
 165 170 175
 Leu Thr Lys Tyr Gly Ser Lys Val Tyr Ile Ile Asp Arg Arg Asp Ala

Phe	Val	Ala	Ile	Gly	His	Ser	Pro	Asn	Thr	Ala	Ile	Phe	Glu	Gly	Gln
				245					250					255	
Leu	Glu	Leu	Glu	Asn	Gly	Tyr	Ile	Lys	Val	Gln	Ser	Gly	Ile	His	Gly
				260				265					270		
Asn	Ala	Thr	Gln	Thr	Ser	Ile	Pro	Gly	Val	Phe	Ala	Ala	Gly	Asp	Val
				275			280					285			
Met	Asp	His	Ile	Tyr	Arg	Gln	Ala	Ile	Thr	Ser	Ala	Gly	Thr	Gly	Cys
	290					295					300				
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Lys															

<210> 26
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 <212> DNA
 <213> Arabidopsis thaliana

<400> 26

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cagcgacttt	gtctaactct	aagattgatg	tgatttggaa	ctcgtctgtt	gtggaagctt	660
atggagatgg	agaaaagatg	gtgcttggag	gattgaaagt	gaagaatgtg	gttaccggag	720
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agtttttgga	tggtggtggt	gagtttagatt	cggatgggta	tgttgtcacg	aagcctggta	840
ctacacagac	tagcgttccc	ggagttttcg	ctgcgggtga	tgttcaggat	aagaagtata	900
ggcaagccat	cactgctgca	ggaactgggt	gcatggcagc	tttggatgca	gagcattact	960
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<210> 27
 <211> 966
 <212> DNA
 <213> Escherichia Coli

<400> 27

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ggcggccaac	tgaccaccac	cacggaagtg	gaaaactggc	ctggcgatcc	aaacgatctg	180
accggtccgt	tattaatgga	gcgcattcac	gaacatgcca	ccaagtttga	aactgagatc	240
atttttgatc	atatcaacaa	ggtggatctg	caaaaccgtc	cgttccgtct	gaatggcgat	300
aacggcgaaat	acacttgcca	cgcgctgatt	attgccaccg	gagcttctgc	acgctatctc	360
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ggtttcttct	atcgcaacca	gaaagttagc	gtcatcggcg	gcggcaatac	cgcggttgaa	480
gaggcgctgt	atctgtctaa	catcgcttgc	gaagtgcata	tgattcaccg	ccgtgacggg	540
ttccgcgcgg	aaaaaatcct	cattaagcgc	ctgatggata	aagtggagaa	cggcaacatc	600
attctgcaca	ccaaccgtac	gctggaagaa	gtgaccggcg	atcaaattgg	tgtcactggc	660
gttcgtctgc	gcgatacgca	aaacagcgat	aacatcgagt	cactcgacgt	tgccgggtctg	720
tttggttgcta	tcgggtcacag	cccgaatact	gcgattttcg	aagggcagct	ggaactggaa	780

aacggctaca tcaaagtaca gtcgggtatt catggtaatg ccacccagac cagcattcct 840
ggcgtccttg ccgcaggcga cgtgatggat cacatttatc gccaggccat tacttcggcc 900
ggtacaggct gcatggcagc acttgatgcg gaacgctacc tcgatggttt agctgacgca 960
aaataa 966

<210> 28
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<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 28
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<210> 29
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 29
atagagctct tactgggccg cgtgtag 27

<210> 30
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 30
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<210> 31
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<220>
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aactctagac tcggtggact gtcaatg 27

<210> 32
<211> 19
<212> DNA
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<220>
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<400> 32
 ccaagaagtt cccagctgc 19

<210> 33
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 <212> DNA
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<220>
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<400> 33
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<210> 34
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<220>
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<400> 34
 catcgagaca agcacggtca acttc 25

<210> 35
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<220>
 <223> Primer

<400> 35
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<210> 36
 <211> 27
 <212> PRT
 <213> Rattus Rattus

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 Pro Lys Lys Met Leu Gln Leu Val Gly Val Thr
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<210> 37
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 <213> Mus Musculus

<400> 37
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 1 5 10 15
 Asp Arg Phe Met Gln Asn Ser Cys Val Pro Lys Lys

20

25

<210> 38
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 <212> PRT
 <213> Mus Musculus

<400> 38
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 1 5 10 15
 Leu Leu Gln Glu Thr Met Tyr Met Thr Val Ser
 20 25

<210> 39
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 <212> PRT
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<400> 39
 Asp Arg Phe Leu Gln Ala Gln Leu Val Cys Arg Lys Lys Leu Gln Val
 1 5 10 15
 Val Gly Ile Thr Ala Leu Leu Leu Ala Ser Lys
 20 25

<210> 40
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 <213> Mus Musculus

<400> 40
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 1 5 10 15
 Leu Leu

<210> 41
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<220>
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26

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<223> Cyclin A Destruction Box

<400> 48

Arg Thr Val Leu Gly Val Ile Gly Asp

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<210> 49

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<223> Primer

<400> 49

ccaagaagtt cccagcgtc

19

<210> 50

<211> 18

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<223> Primer

<400> 50

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18

<210> 51

<211> 9

<212> PRT

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<223> Cyclin B1 Destruction Box

<400> 51

Arg Thr Ala Leu Gly Asp Ile Gly Asn

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